

## **REMARKS**

### **The Pending Claims and the Amendments to the Specification and Claims**

With the entry of the amendments above, the pending claims remain as Claims 1-25. Each of Claims 1-9 have been amended to recite the gas barrier layer comprising a polymer which crystallizes upon aging and the inflatable cellular cushioning product has been aged for a temperature and time to ensure that the crystallinity of the polymer in the in the gas barrier layer is substantially complete. Support for this amendment can be found in the specification at, for example, Page 13 lines 7-10 taken with Page 39 lines 15-20. In addition, Claims 6 and 7 have been amended to correct an obvious typographical error, in that the phrase “days hours” is obviously incorrect, and the intent is clearly to recite only “days”. That is, the amended phrase in Claims 6 and 7 is more fully set forth as “...with the resulting inflated article being subjected to a load of 0.1 psi for a period of 7 days at a temperature of 140°F....” Subjecting the inflated article to a load for a period of days (not hours) corresponds with each the various creep tests disclosed from Page 39 line 5 through Page 40 line 11. As a result, one of skill in the art reading the entire specification would realize the typographical error and realize that the time period is intended to be in days, not hours. The amendment to Page 11 of the specification is to the same effect. The amendments to the specification and claims include no new matter.

### **The Rejection of Claims 1-25 over SIMHAE or LARSON in view of Applicants' Discussion of the Prior Art and WU et al, SHIDA et al, or ADUR**

In Section 2 of the 11 August 2004 Office Action, Claims 1-25 are rejected as obvious over U.S. Patent No. 6,423,166, to Simhaee (“SIMHAE”) or U.S. Patent No. 4,096,306, to Larson

("LARSON") in view of Applicants' discussion of the prior art and any of U.S. Patent No. 3,873,643, to Wu et al ("WU et al"), U.S. Patent No. 4,087,587, to Shida et al (SHIDA et al"), or U.S. Patent No. 4,394,485, to Adur ("ADUR").

In response, Applicants contend that Claims 1-25 are patentable over SIMHAEE or LARSON in view of Applicants' discussion of the prior art and any of WU et al., SHIDA et al, or ADUR. Applicants contend that the Office Action fails to make out a prima facie case of obviousness of any one or more of Claims 1-25 as obvious over SIMHAEE or LARSON in view of Applicants' discussion of the prior art and WU et al., SHIDA et al, or ADUR.

#### Applicants' Invention

Before turning to a discussion of the prior art, Applicants direct attention to the invention as claimed in independent Claims 1-9. Each of these independent claims is directed to an inflatable cellular cushioning article comprising a multilayer film having a seal layer, a gas barrier layer, and a tie layer between the seal layer and the gas barrier layer. Claim 1 further characterizes the inflatable cellular cushioning article by reciting the tie layer as comprising an anhydride modified olefin polymer containing anhydride at a level of at least 150 ppm, based on the weight of the modified olefin polymer. Rather than reciting the composition of the seal layer, independent Claims 2-9 recite the cell size, film weight, and a performance capability. The performance capabilities are:

(Claims 2 and 3): a failure pressure of at least 7 psi;

(Claims 4 and 5): an ability to withstand inflation to at least 3 psi at 23°C,

the inflated article being subjected to 0.542 atmosphere for 5 minutes at 23°C;

(Claims 6 and 7): an ability to withstand inflation to at least 3 psi at 23°C, the inflated article being subjected to a load of 0.1 psi for a period of 7 days at a temperature of 140°F;

(Claims 8 and 9): an ability to withstand inflation to at least 3 psi at 23°C, the inflated article being subjected to a temperature of 140°F for 4 hours.

#### The SIMHAEE Reference

Turning first to SIMHAEE, Applicants first note that although SIMHAEE teaches an inflatable cellular cushioning article made from a flexible film, SIMHAEE does not teach or suggest a multilayer film for use in making the disclosed inflatable article. The figures in SIMHAEE appear to disclose a monolayer film, rather than a multilayer film. In addition, SIMHAEE contains no teaching directed to the composition of the film or films to be used to make the inflatable article. SIMHAEE does not teach or suggest the presence of a gas barrier layer or a tie layer. Thus, SIMHAEE provides no reason that one of skill in the art would contemplate interlayer adhesion in the film used to make the inflatable article of SIMHAEE, not to mention higher interlaminar adhesion of a tie layer in a multilayer film used to make an inflatable cellular cushioning product.

#### The LARSON Reference

LARSON is directed to an inflatable cushioning article, and discloses various films from which the inflatable article can be formed, as follows:

The films 14 referred to herein may consist of a polyolefin such as polyethylene, or polypropylene, or be a layered film (e.g., coated, laminated or co-extruded film) such as a polyester backed ethylene vinyl acetate copolymer, a polyvinylidene chloride coated polyethylene, a thermoplastic coated paper or a polyolefin coated polyester. The main requirement for the film is that a heat sealable material forming at least one of its surfaces will fuse to a mating surface to form an air tight seal under the influence of moderate pressure and heat, and that it has desired strength and gas barrier properties. A polyester film, coated with an ethylene vinyl acetate copolymer (e.g., the film sold under the trademark "Scotchpak 113" by Minnesota Mining and Manufacturing Company) has been found to produce air cushions having a very high bursting strength, which may be particularly desirable for some applications; whereas a co-extruded film having polyethylene layers on both sides of a layer of vinylchloridevinylidene chloride copolymer (e.g. the film sold under the trade name "Saranex 11" by Dow chemical company) is less expensive and has an adequate bursting strength and gas barrier for most air cushioning applications. [LARSON, Col. 4 lines 3-25, emphasis added]

The above excerpt from LARSON is the only portion of LARSON directed to the structure and composition of the film used to make the inflatable cellular cushioning product. Although the above excerpt from LARSON does teach the use of specific multilayer films for use in the inflatable cushioning article, including a layer such as polyvinylidene chloride which would serve as an O<sub>2</sub>-barrier layer, this excerpt from LARSON contains no teaching or suggestion of a multilayer film structure containing a tie layer (i.e., adhesive layer) which serves to improve the adhesion of one layer to another. Of the various film structures disclosed in the above excerpt, a "polyester backed ethylene vinyl acetate copolymer" does not contain a tie layer; a "polyvinylidene chloride coated polyethylene" does not contain a tie layer; a "thermoplastic coated paper" does not contain a tie layer; a "polyolefin coated polyester" does not contain a tie layer; a "polyester film coated with an ethylene vinyl acetate copolymer" does not contain a tie layer; and a coextruded film having "...polyethylene layers on both sides of a layer of

vinylchloride vinylidene chloride copolymer” also does not contain a tie layer. Thus, there is no teaching or suggestion in LARSON of the use of any multilayer film having a tie layer for use in an inflatable cellular cushioning article, not to mention any teaching or suggestion in LARSON that there is a need to provide a particularly strong level of adhesion between a seal layer and a gas barrier layer of the multilayer film used to make the inflatable article.

#### Applicants’ Discussion of the Prior Art

The Office Action relies upon Applicants’ discussion of prior art (hereinafter “AAPA”) on Pages 1 and 2 of the specification, including the fact that before the present invention it was known to use a multilayer gas barrier films in bubble sheets containing spaced apart bubbles (i.e., not interconnected in series). The Office Action also relies upon Applicants’ admission that the tie layers in this multilayer film contain an anhydride-modified olefin polymer having an anhydride content of 141 ppm.

In response to the reliance on AAPA in the Office Action, Applicants admit that such a film has been used in Bubble Wrap<sup>®</sup> cellular cushioning. In fact, such a film has performed well in commercially available Bubble Wrap<sup>®</sup> cellular cushioning for a number of years prior to Applicants’ filing date. As such, there has been no need to change, or motivation to change, the polymeric composition of the tie layers in Bubble Wrap<sup>®</sup> cellular cushioning.

Moreover, although not specifically mentioned in the AAPA set forth in the Office Action, Applicants’ specification further refers to films used in *inflatable* cellular cushioning articles. [Bubble Wrap<sup>®</sup> cellular cushioning is not an inflatable cellular cushioning article, as

each cell is independent, with Bubble Wrap<sup>®</sup> cellular cushioning lacking inflatable chambers each having a plurality of inflatable cells connected in series.] Applicants' specification states, on Page 2 lines 6-7, that "One of these [inflatable] products has been made from the same multilayer film used for Bubble Wrap<sup>®</sup> cellular cushioning." Applicants acknowledge that the prior art also includes an *inflatable* article made from a multilayer film having the layer arrangement: seal layer / tie layer / barrier layer / tie layer/ abuse layer. Two pieces of this film were sealed to make the inflatable cellular cushioning article, which was thereafter inflated to a pressure of about 1 psi. As with the film from which the Bubble Wrap<sup>®</sup> cellular cushioning was made, this film performed well in the commercially-available inflatable cellular cushioning article. Thus, as with the Bubble Wrap<sup>®</sup> cellular cushioning, there was been no need or reason to change the polymeric composition of the tie layers of the film, as the film performed well.

#### How Applicants' Were Motivated to Make Their Invention

However, Applicants thereafter increased the internal pressure to which the inflatable article was inflated, i.e., the inflatable article was inflated and sealed closed with the internal pressure being increased from about 1 psi to about 3 psi. The inflated product having the 3 psi internal pressure is not in the prior art. Although the pressure within the article was increased, initially there was no change in the film from which the inflatable article was made. The resulting inflated article initially appeared to perform well, with the increased internal pressure enhancing the cushioning properties of the inflated article, compared with the same article inflated to about 1 psi. However, it was surprisingly found that when the resulting 3 psi product

was exposed to increased temperature (e.g., about 130-140°F) at an ambient pressure of approximately sea level, the product failed. The failure was visibly apparent in that the seal layer of at least one of the layers failed, with the layers of the film simultaneously delaminating, with the result that the pressurized air within an inflated chamber caused the propagation of the delamination, the air filling the extended delaminated region between the delaminated film layers.

The solution to the delamination problem was not immediately apparent. Film extrusion variables (e.g., extrusion temperatures) were altered in an effort to increase the interlayer adhesion. Different tie layer polymers touted as having strong adhesion were substituted for the tie layer polymer, initially without success. Eventually, the polymer in the tie layers was changed by substituting an anhydride-modified olefin polymer having a higher anhydride content of at least 150 ppm. The result was an inflatable article which could be inflated to 3 psi and placed in an environment of 130-140°F, without delamination.

Applicants provide this explanation of the nature of the problem which occurred, and the manner in which the problem was solved, for the purpose of contrasting the *real-world motivation* which caused Applicants' to make their invention with the *lack of motivation* set forth in the Office Action. The Office Action has not brought forth any prior art showing that there was any recognized need to improve the level of interlayer adhesion between the various layers of the multilayer film used in Applicants' claimed inflatable article. The reason there was no need to improve interlayer adhesion is clear: (a) the Bubble Wrap® cellular cushioning did not exhibit the delamination problem as it contained air at ambient pressure and was not inflated to

superatmospheric pressure; and (b) the inflatable cellular cushioning product in the prior art which had the seal/tie/barrier/tie/abuse layer arrangement was inflated only to about 1 psi and therefore did not exhibit the delamination problem. Thus, there was no need to strengthen the interlayer adhesion, as these products did not exhibit any problem with the level of interlayer adhesion. As there was no problem, there was no need to make a change in the films used to make these products.

The Secondary References: WU, SHIDA et al, and ADUR

Turning next to the secondary references relied upon in the Office Action, Applicants point out that although WU et al, SHIDA et al, and ADUR describe anhydride modified polymers which are capable of providing stronger adhesive properties, it was Applicants who discovered that these more strongly adhesive polymers are needed in order to improve the burst strength of an inflatable cellular cushioning article. More importantly to the issue of motivation, the Bubble Wrap® cellular cushioning and inflatable cellular cushioning of the prior art was not provided with a high enough internal pressure to provide any incentive to look at different tie layer polymers. As a result, one of ordinary skill in the art would not have been looking to change the composition of the multilayer films used in the Bubble Wrap® cellular cushioning or the inflatable cellular cushioning of the prior art. Still further, there is no teaching or suggestion in the prior art that the use of the anhydride modified polymer of WU et al, SHIDA et al, and ADUR in the tie layer of a multilayer film used in an inflatable cellular cushioning article can increase the failure pressure of the inflatable cellular cushioning article, or provide any other beneficial characteristic to an inflatable cellular cushioning article.



Applicants' Claims 1-25 are Patentable over the Prior Art

The Office Action fails to set forth a prima facie case of obviousness of Claims 1-25 because there is no need in the prior art to provide a tie layer which generates greater interlayer adhesion in the multilayer films used in the prior art cellular cushioning articles. The prior art articles have functioned satisfactorily at the low internal pressure utilized in the prior art. Without raising the internal pressure requirements, one of ordinary skill has no motivation to use a tie layer that provides greater interlayer adhesion. The prior art fails to suggest increasing the internal pressure in the inflatable cellular cushioning article.

Moreover, the prior art provides no expectation of success in substituting the tie layer composition recited in Applicants' Claim 1 for the tie layer composition utilized in the prior art cellular cushioning articles. Still further, there was no expectation that changing the tie layer composition could result in the inflatable cellular cushioning articles which exhibit the performance characteristics recited in Applicants' Claims 2 through 9.

The combination of references set forth in the Office Action is motivated by impermissible hindsight, rather than by the prior art. In fact, it is Applicants who have brought forth each of the secondary reference documents as teaching a polymer suitable for use in the tie layer to provide the enhanced interlayer adhesion which results in Applicants' claimed inflatable article which can withstand greater internal pressure without delamination.

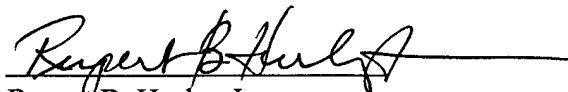
Related USSN 10/302,004

Applicants note that the claims as amended above are similar to the claims in related USSN 10/302,004, with the difference being the aging language added by this amendment. Applicants contend that Claims 1-25 are patentable for at least the reasons presented in the response Applicants filed on 11 February 2005 in USSN 10/302,004, these reasons being repeated in the instant amendment. Moreover, Applicants contend that neither SIMHAEE nor LARSON nor WU nor SHIDA nor ADUR nor the prior art discussed in Applicants' specification teaches or suggests an inflatable cellular cushioning article having a gas barrier layer comprising a polymer which crystallizes upon aging, with the inflatable cellular cushioning product having been aged for a temperature and time to ensure that the crystallinity of the polymer in the in the gas barrier layer is substantially complete.

Conclusion

Applicants respectfully request reconsideration of the patentability of Claims 1-25, with a view towards allowance.

Respectfully Submitted,



Rupert B. Hurley Jr.

Reg. No. 29,313

Attorney for Applicants

(864) 433-3247

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